

Overview of the Dust, Silica and Noise Control Program
For The Vegetation and Soil Sample Processing Room
Located on the 12th Floor of the Provincial Building
at 199 Larch Street, Sudbury

J. J. Negusanti
Environmental Biologist

R. R. Potvin
Chief, Air Quality Assessment

Technical Support Section
Northeastern Region
Ontario Ministry of the Environment

February, 1987

NER-AQTM-03-87

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Overview of the Dust, Silica and Noise Control Program
for the Vegetation/Soil Sample Processing Room
Located on the 12th Floor of the Provincial Building
at 199 Larch Street, Sudbury

Introduction:

The processing room was first used following the opening of the Provincial Building in June of 1980. The purpose of this room, which is a section of the vegetation and soils laboratory, was to oven-dry and grind the large number of soil and vegetation samples collected each year by the Phytotoxicology Unit (now Pesticides and Terrestrial Effects). After processing, the samples are bottled, labelled and shipped to the Toronto laboratory for appropriate chemical analysis.

The processing room is approximately 8' x 10' with one 10' wall that is windowed. Originally, this room consisted of two drying ovens (Fisher Isotemps Oven Model 349 and 30F), one Wiley Mill (Model Ed-5), one shopvac vacuum and one soil sieve shaker (RX-2A). In 1981, a third oven (Stabil-Therm Gravity Oven) was installed. In 1982, a second Wiley Mill (smaller model) and soil grinder (Retsch) were placed in this room. Two counters exist in this room. One is entirely used up with the three drying ovens. All other mentioned apparatus are located on the opposite counter facing the window. No dust control system was installed.

Dust and Silica Abatement Program:

After two field seasons, it became apparent that a dust control system was needed. Dust was accumulating on the counters, foul odours were detected, and health concerns were raised. Tony Spires, of the Phytotoxicology Unit requested on October 1, 1981, that the Safety Committee look into the health concerns associated with the fine dust given off while grinding soils whose SiO_2 content was as high as 70%. The response (Memos 1 and 2) was that a properly engineered dust collection system be installed and 3M 8710 disposable masks be used by personnel in the processing room. Ken Waldie, of the Air Quality Section, believed dust accumulating on equipment and counters in the adjacent Air Quality laboratory was associated with the processing room. The Safety Committee Chairman, John Bassett, felt that this problem would also be rectified by the installation of a proper dust collection system (Memo 3).

W. D. McIlveen, of the Phytotoxicology Unit, in a memorandum (4) to L. Fitz, of the Air Quality Section, outlined the background and use of the processing room and expressed the need for a ventilation system.

The contract for a dust collection system was awarded to Coogan Construction, who installed the system on August 15, 1983. An oversight by the company created problems during

installation. The single unit plexiglass hood would not fit in the building elevators; therefore, the unit had to be sectioned. As a result, the unit was not sufficiently stable and required periodic glueing. The sliding doors were also poorly constructed and were labelled as a safety hazard. The dust collected under the hood was sucked into an Aerocology Dust Arrester DA 500. The exhaust from the arrester was not vented. The system did lessen the dust problem, but there still seemed to be a substantial amount of fugitive dust.

As required by an Order from the Ministry of Labour issued in March, 1984, an assessment for exposure to silica was made by W. D. McIlveen in May, 1984, and reported in a memorandum (5) to J. Pomerleau. This assessment acknowledged the likely presence, in variable amounts, of silica in soil samples and estimated a potential exposure of workers to silica in the processing room of about 20 days per summer per person. Based on the dust control system in use and the safety procedures in place, it was felt that a health hazard from silica exposure was unlikely.

In January, 1985, Mr. Collinson with the Ministry of Labour audited this assessment and, in view of the potential hazard, recommended that Orders be issued to put into effect a silica control program, as outlined in Section 7 of the silica Regulation, and to require the local exhaust system to be

vented outside the building. These Orders were issued to the MOE on January 22, 1985. In order to properly assess the actual worker exposure to silica and to determine if a silica control program, as described in Part 7 of the Regulation, was warranted, the Ministry of Labour conducted an air sampling survey of silica and total dust in the sample preparation room. The results (presented in Report 1) were interpreted by Mr. Collinson, who concluded that the airborne silica concentrations appeared to be at or below the exposure standard. The total dust levels were found to be below the standard. Nevertheless, in view of the concern about silica, Mr. Collinson advised the issuance of an Order requiring the local exhaust system to be vented outside the building. He also suggested that the vacuum cleaner used to clean the screens should also be fitted with a high efficiency particulate air filter.

During the summer of 1986, the exhaust of the dust collection system was vented to the building washroom exhaust system. In addition, the dust collection hoods were restructured into a stable, safe and efficient unit. Also, as described below, a central vacuum system was installed in an adjacent room, thereby obviating the need to improve the dust collection efficiency of the shopvac vacuum cleaner which is no longer used in the sample processing room.

Silica Control Program:

In conclusion, although there is some potential for worker exposure to silica, the exposure is judged to be below the standard of 0.2 mg/m^3 recommended in the silica Regulation. Hence, it is felt that there is no health hazard from silica due to the processing of soil samples. Consequently, based on the overall assessment made by the Ministry of the Environment with input from the Ministry of Labour, it is recommended that a silica control program as described in Section 7 of the Regulation is not necessary.

However, the Ministry is prepared to undertake the following program to ensure that worker exposure to silica remains within the standard set out in the Regulation.

- a) an exposure assessment program will be conducted if the current equipment or ventilation system is modified.
- b) the efficiency of the local exhaust system will be measured (face velocity, air flow rates, etc.) if the system is modified.
- c) the vegetation and soil processing equipment will not be used if the dust collection and ventilation system is not operating or is operating unsatisfactorily.

- d) workers, while processing samples, must wear approved dust masks; the type currently in use is 3M 8710.

Noise Abatement Program:

With the purchase of a new shopvac vacuum to replace the old one, concern was expressed about the noise level in the processing room. Noise levels were first measured by Wayne Maitland, Regional Safety Officer, on June 10, 1986 (Report 2). The vacuum cleaner produced unacceptable noise levels. All other apparatus operating singly or in combination were within acceptable noise levels. It was then recommended by Jim Pomerleau, Manager, Administrative Services, to install a quieter model (Memo 6). A central vacuum cleaner system was installed on June 23, 1986. The vacuum cleaner unit (Beam Condo Vac Model 166) was placed in the drying room, which is adjacent to the processing room. The piping from the vacuum cleaner connecting the two rooms runs through the ceiling space above the suspended tile ceiling. The outlet was placed in the wall opposite to the entry door to the processing room. The vacuum is activated by plugging-in a separate vacuum hose used in the processing room. This is a very quiet and efficient system. The hose is conveniently placed on a wall bracket when not in use. With no vacuum cleaner present in the processing room, it frees up needed space thereby making it easier to work. Due to the improved vacuum cleaner system, regular cleaning of the entire processing room is much easier.

Noise levels were again tested by Wayne Maitland, and levels were found to be acceptable (Memo 7). The list of acceptable noise levels was posted in the processing room, and the noise levels will be tested with each change of apparatus to ensure that they remain acceptable.

Safety Training and Procedures:

To ensure maximum efficiency and safety, all new staff working in the processing room are to receive appropriate safety training from their immediate supervisor. As mentioned earlier, all staff, while processing samples, must wear CSA approved dust masks (3M 8710). Safety glasses, ear protection and lab coats are available, and workers are encouraged to wear these items. New workers are to be fully trained on each apparatus as to its proper use and maintenance. The Aerocology Dust Arrestor filter bags must be shaken once for every two hours of use.

JJN-24

Attachments



Ontario

Ministry Northeastern
of the Region
Environment

199 Larch Street
Sudbury, Ontario
P3E 5P9
(705) 675-4501

1982 01 13.

M E M O R A N D U M: 1

TO: Safety Committee

FROM: J. T. Bassett,
 W. Maitland.

RE: Soils and Vegetation Lab Dust Complaint.

In response to a memo to the Safety Committee from Tony Spires regarding dust in the soils and vegetation lab, W. Maitland and J. Bassett investigated.

The room in which soil and vegetation samples are processed (pulverized and screened) was found to have a heavy coating of dust on all equipment, benches and window sills etc. It was also noted that the dust mask being worn by staff at the time of the inspection was built up with dust and that the mask fit very poorly. (It fit so poorly in fact, that dust was found inside the mask)

It is our understanding that Bill McIlveen was dealing with Ministry of Government Services on providing some type of dust collection and treatment but that, due to staff changes at MGS and some procedural difficulties, MGS had not installed the system.

According to Tony Spires, SiO_2 content of the mineral soils can be as high as 60 to 70%.

Gord Collinson of the Ministry of Labour, Occupational Health Branch provided the following information on allowable dust concentrations:

<10 μ	5 mg/m^3	for 8 hour time weighted average.
Total dust	10 mg/m^3	" " "
SiO_2	0.1 mg/m^3	" " "

Mr. Collinson felt that due to the high SiO_2 content of the soils, the work area should be exhausted.

Based on the findings of this investigation the following is recommended:

1. That a properly engineered dust collection system be installed with a minimum of delay (certainly not later than the coming field season).
2. That in the interim, an improved dust filter type mask be provided to staff working in this room. Mr. Collinson recommended a 3M 8710 disposable type which is NIOSH approved. (The mask presently in use - 3M 8500 is not NIOSH approved)

Should these recommendations be accepted by the committee, they will be forwarded to Mr. J. G. Fry for his action.

JTB/sgl/4536

W. Maitland and J. T. Bassett.

Handwritten signatures of W. Maitland and J. T. Bassett. The signature of W. Maitland is written above the signature of J. T. Bassett. Both signatures are in cursive script.



Ontario

Ministry of the Environment
Northeastern Region

199 Larch Street
Sudbury, Ont.
P3E 5P9
(705) 675-4501

1981 01 20.

M E M O R A N D U M : 2

TO: Mr. J. Fry,
Manager,
Technical Support.

FROM: J. T. Bassett,
Chairman,
Northeast Region Health and Safety Committee.

RE: Meeting #2, January 14, 1982.

The attached memos (McIlveen to Fitz and Maitland-Bassett to Safety Committee) outline a dust problem in the soils and vegetation lab on the 12th floor which was referred to the Safety Committee.

The Health and Safety Committee has endorsed the recommendations on page 2 of the Maitland-Bassett memo, namely (1) that a properly engineered dust collection system be installed with a minimum of delay (certainly not later than the coming field season), (2) that, in the interim, an improved dust filter type mask be provided to staff working in this room. Mr. Collinson recommended a 3M 8710 disposal type which is NIOSH approved (the mask presently in use - 3M 8500 is not NIOSH approved).

By means of this memo, these recommendations are being forwarded to you for implementation. Should you wish to discuss this item, please feel free to do so.

JTB/sgl/6770

J. T. Bassett.

c.c.: C. E. McIntyre
J. Wesno
J. Moore
J. O. Pomerleau
W. Gibson
Safety Committee Members
W. D. McIlveen
T. Spires

1982 01 29.

M E M O R A N D U M : 3

TO: File AD 63-02
Northeast Region Health and Safety
Committee.

FROM: J. T. Bassett,
Chairman,
Northeast Region Health and Safety
Committee.

RE: Soils and Vegetations Lab - Dust Control.

On January 28, 1982 I met with Ken Waldie in the Air Quality Lab to discuss the dust problem which Ken believes originates in the soils and vegetation lab.

Although lab benches had recently been cleaned by cleaning staff, there was a film of dust on an uncleaned area of the bench beneath the eyewash and a much heavier coating of dust on top of a wall-mounted cabinet near the eyewash. There appears to be a heavier coating of dust in the air quality lab and in the pathology lab (both immediately adjacent to the soil and vegetation lab) than in other areas of the 11th and 12th floors I have examined.

Circumstantially, this points to the soils and vegetation lab as the origin of the dust; however, without expensive electron microscopy examination of samples of the dust, I do not think it can be proven conclusively.

I do not feel, at this time, with the recent investigation and recommendation from the Health and Safety Committee, the commitment from Jim Fry to have an exhaust system installed and the relatively low level of activity in the soils and vegetation lab at this time of year that the situation warrants the expenditure for these analyses.

Ken Waldie agrees with this interpretation and has agreed to discuss the situation further with Les Fitz and Bill McIlveen should the situation worsen before installation of the dust collection system.

JTB/sgl/Job A-2


J. T. Bassett.

c.c.: J. Fry
J. O. Pomerleau
L. Fitz
All Committee Members

W. McIlveen
W. Maitland
K. Waldie

1982 01 12.

M E M O R A N D U M : 4

TO: Mr. L. W. Fitz,
Chief,
Air Quality Assessment.

FROM: W. D. McIlveen,
Plant Pathologist.

RE: Dust Control in the Vegetation and Soils Lab.

The following is a brief, chronological summary of the measures which we have undertaken to control dust in the Vegetation & Soils Laboratory. At present, the grinding room is equipped with 3 drying ovens on the bench on one side of the room and a grinder for vegetation samples on a bench along the windows on the other side of the room. A new, smaller grinder will be added in the near future. The grinder is cleaned between samples with the assistance of a shop-vac vacuum cleaner. I can not foresee that vegetation dust particle concentrations in that room would ever reach the situation where they could become an explosion hazard; however, we must be prepared to avoid that possibility. Another problem with drying certain types of vegetation is the odour they produce. A ventilation system was installed at the Phytotoxicology Section at 880 Bay Street for this reason.

It was intended that soil samples would also be ground in the grinding room. Air dried soil samples are hand-ground in a mortar and pestle and sieved to suitable sized fractions with a moderate amount of fine dust production. This fine dust is a nuisance as it lands on benches and equipment in the laboratory. Staff performing the work must wear lab coats and dust masks to reduce inhalation of the dust.

In our original request for laboratory space, I requested that positive air pressure should be present in the "Pathology Room" and in the "Air Drying Room". This would reduce the likelihood that any dust could enter and contaminate samples in these rooms. On the other hand, it was felt that the grinding room could be rather dusty and that a negative air pressure would reduce the escape of dust particles into areas of the building. Shortly after the Ministry moved into the building in June, 1980, we requested a report on air flow patterns in the building to determine if our requests had been met. After our inquiry had passed through appropriate channels, the laboratory was examined by D. Hum of M.G.S. and R. Allard, Building Manager. It was their conclusion that it would be too difficult from an engineering standpoint to comply with the original request for the special air flow patterns in the laboratory. Ventilating the grinding room through the existing fume hoods in the Water Quality and Air Quality Labs was ruled out. (We had requested a fume-hood for the Vegetation Lab with the original lab design request but this was turned down). At that time, it was proposed by M.G.S. that they would provide a mobile air re-circulating and cleaning unit which could be stored under the bench. This proposal was later changed to incorporate the recirculating unit into a system that would approximate a portable fume-hood or dust hood that could enclose the sieve shaker systems. M.G.S. developed a plan for the apparatus for our approval, but we had to revise the dimensions of the unit so that it would meet our needs while we endorsed the design in principle. After some delay, we were asked to provide justification for the unit so that construction and purchase of materials for the unit could proceed. This we did and believed that construction would be undertaken.

In October, 1981, I contacted M.G.S. to determine if any progress in construction of the unit had been made. I then learned that D. Hum had moved to another Ministry and that he had been replaced by Mr. J. Weiss. Mr. Weiss was provided with copies of correspondence and information related to the situation with the understanding that he would look after getting the work started. (About this time, T. Spires requested that MOE Safety Committee look into the problem). A later call to Mr. Weiss was not returned. On January 6, 1982, members of the MOE Safety Committee examined the laboratory and were shown the nature of the problem. On that date M.G.S. was contacted again and according to Mr. Weiss, nothing had been done because M.G.S. had never received any formal request for the work to be done. No work could be done until this formal request had been completed. I indicated that we were reviewing the situation and would proceed with our request at the conclusion of that review.

Members of the Safety Committee who examined the laboratory agree that a problem exists and it is expected that they will make recommendations to the Managers to have the situation rectified as soon as it is practical to do so.

It is now our opinion that the entire grinder bench should be enclosed within a vented-chamber and that all grinding of soils and vegetation as well as sieving of soil be completed within this chamber. The chamber should be provided with plexi-glass doors and the fan exhaust system. The fan should be of sufficient capacity to ensure that air flow velocity will prevent dust from escaping into the rest of the laboratory. However, the installation of the exhaust system may provide some engineering and other problems. We would like your comments and assistance to ensure that installation of the proposed system can proceed without further delay. A sketch of the envisaged chamber is attached.

WDM/cck/8196

W. D. McIlveen.

Attach.

FRONT VIEW - GRINDER BENCH ENCLOSURE

EXHAUST FAN

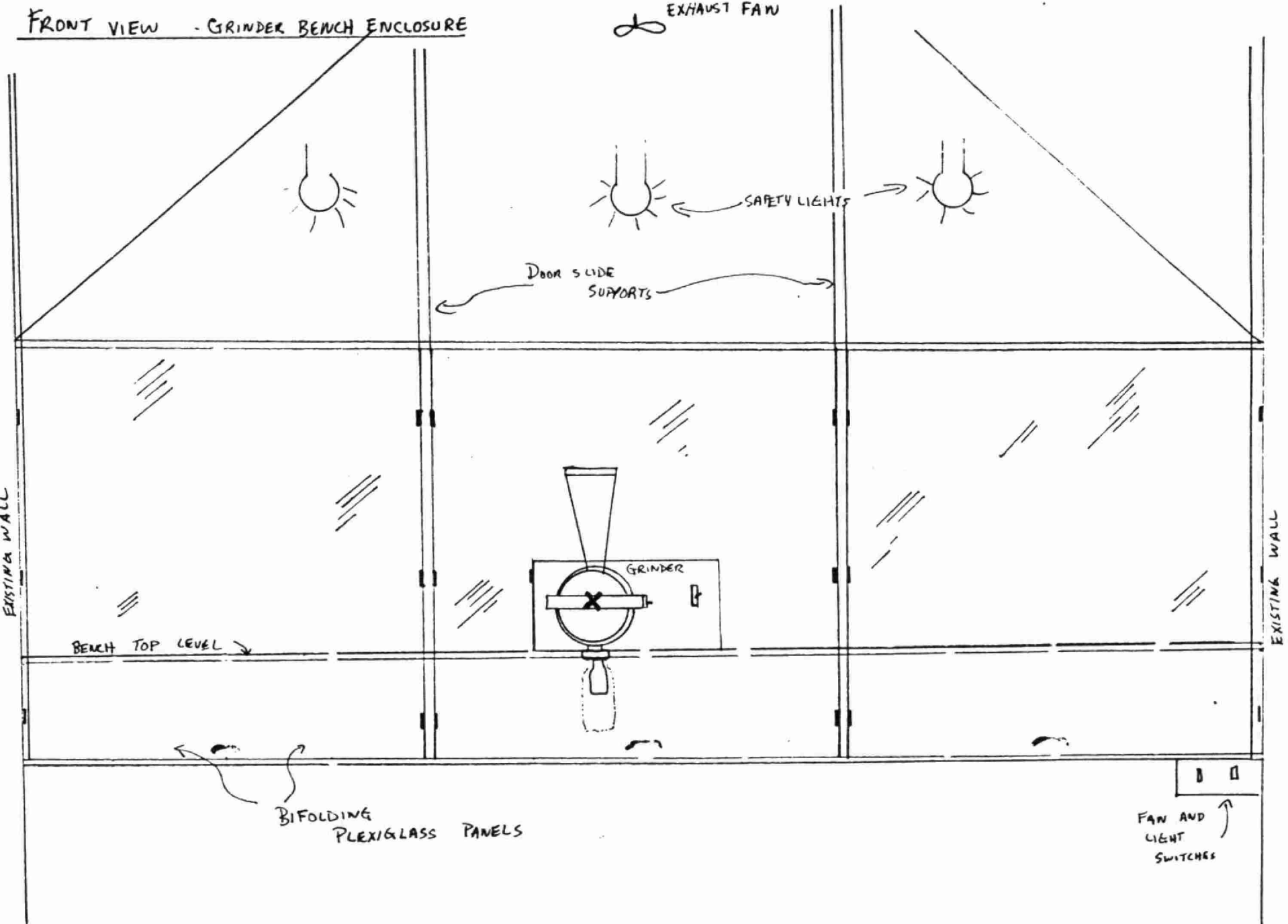
EXISTING WALL

EXISTING WALL

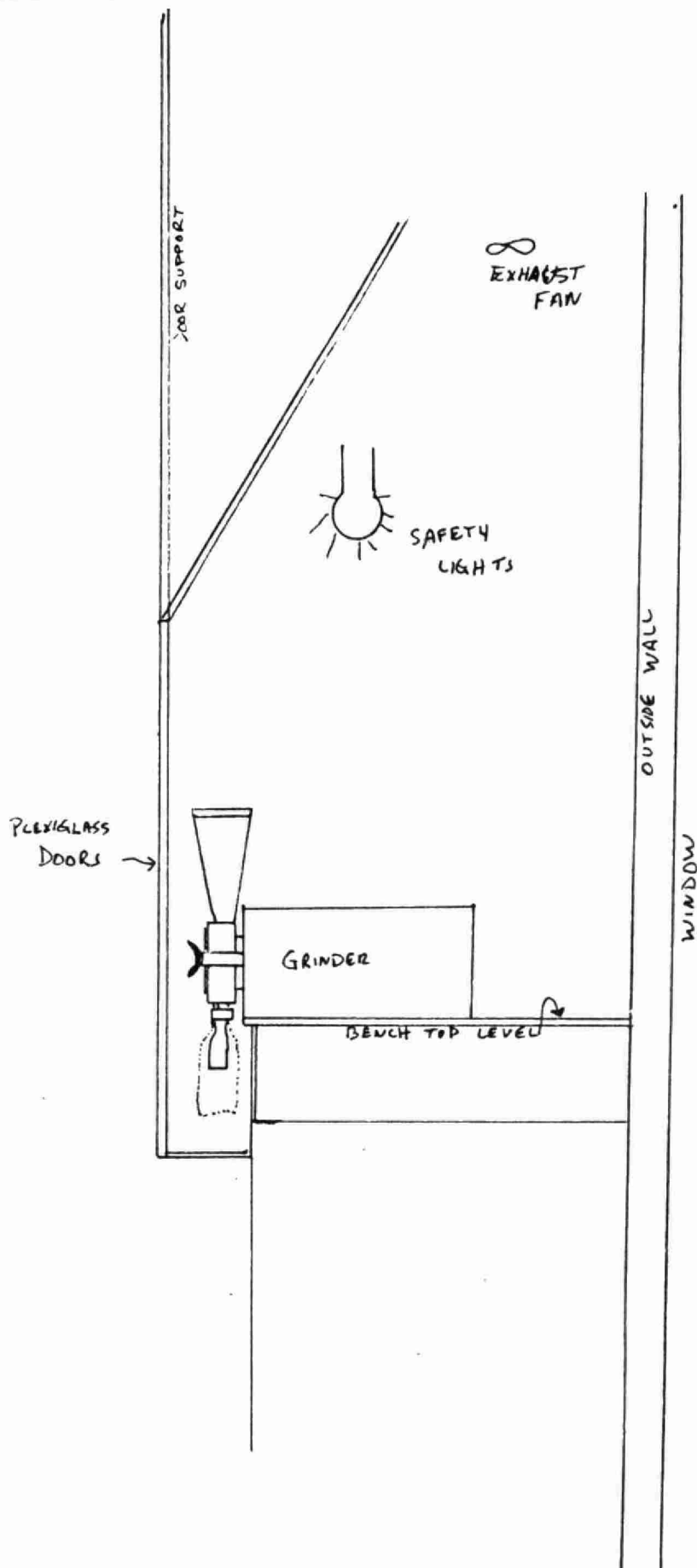
BENCH TOP LEVEL

BIFOLDING PLEXIGLASS PANELS

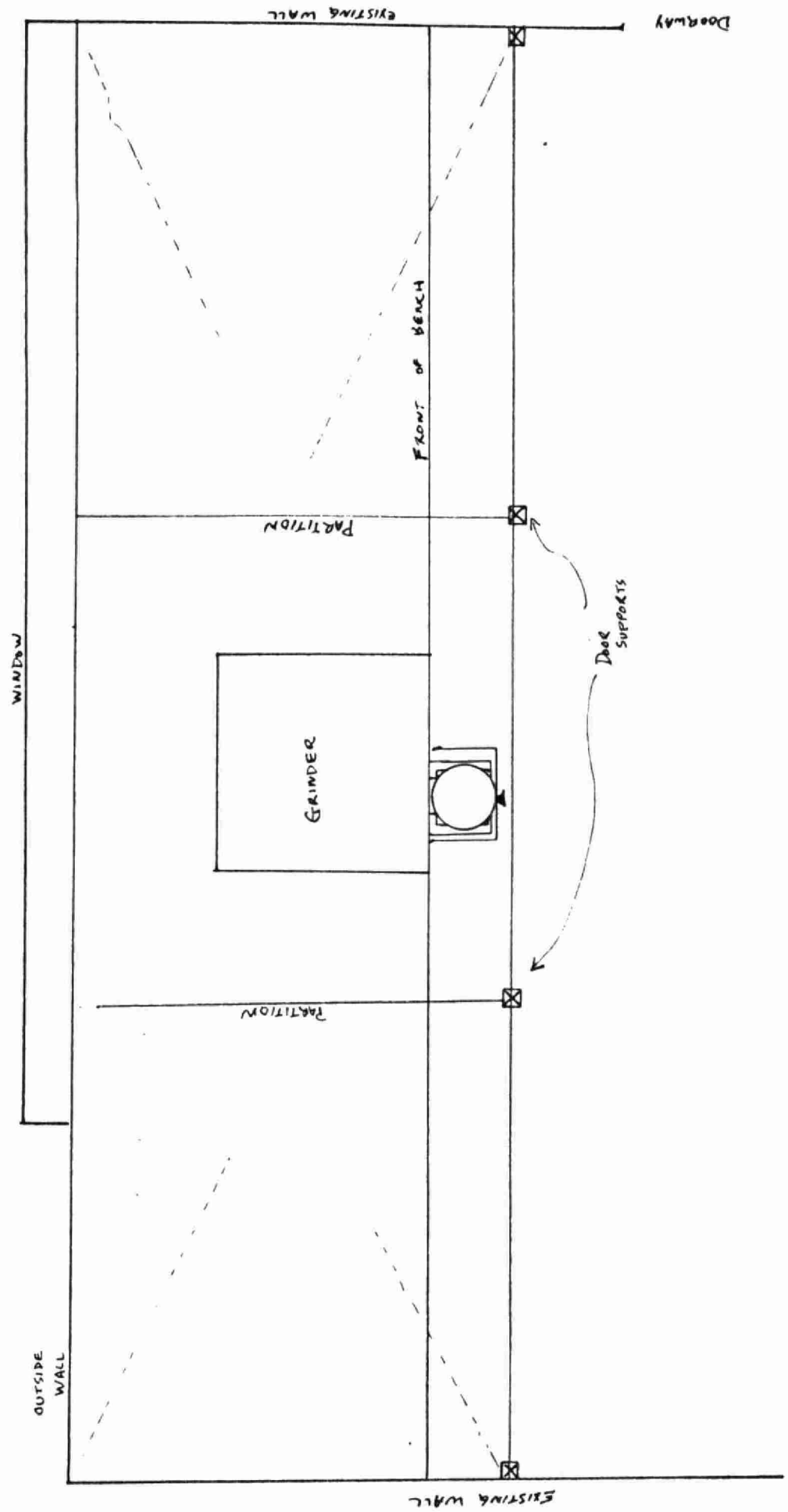
FAN AND LIGHT SWITCHES



END VIEW - GRINDER BENCH ENCLOSURE



TOP VIEW - GRINDER BENCH ENCLOSURE





1984 05 18.

199 Larch Street
Sudbury Ontario
P3E 5P9
705/675-4601

199, rue Larch
Sudbury (Ontario)
P3E 5P9
705/675-4601

MEMORANDUM 5

TO: Jim Pomerleau,
Manager, Administrative Services

FROM: W. D. McIlveen,
Plant Pathologist

RE: Silica Assessment in the Soils Grinding Room

With respect to your memo of April 11, 1984, the following information is presented as a report on the evidence of silica on the 12th floor grinding room.

The substance of concern in the laboratory is silica. This has not been confirmed by any analytical method but silica is known to be present in highly variable amounts in soil as a natural component. Depending upon the soil, from 50 - 95% may composed of silicon dioxide (SiO_2). We normally process in the neighborhood of 200 kg of soil each year with most of the processing being carried out in the summer months.

The samples are usually received in plastic bags in a moist condition. The samples are then air dried and ground in order to facilitate chemical analysis in the laboratory in Toronto. The process of grinding the samples involves hand grinding in a mortar and pestle or mechanical grinding in a motorized mortar and pestle. Samples are sieved to ensure that the soil will pass 45 mesh and on occasion through a 100 mesh sieve. The samples are processed individually.

The potential for exposure of persons to the silica is highly variable. Up to 6 workers may be involved in any year with no restrictions as to sex. Hours of exposure vary from 0 to 7 hours per day but this latter would be exceptional. A reasonable estimate of the number of the days where this would be involved is about 20 per summer per person. The exposure would be mainly as dust and the route of exposure would be primarily inhalation although dust might also contact the skin on the hands. Ingestion would not be involved. The work bench is covered by a hood system equipped with an air filter system which recirculates the air into the lab. The work area is isolated from the rest of the lab and the building.

At the work site, laboratory coats are available as well as eye protection devices. The lab is also equiped with eye wash and deluge showers if required. Dust masks are

available if required. The other facilities include lunchrooms which are separate from the laboratory. There are washrooms available nearby. First aid equipment is also available in the laboratory. The laboratory is cleaned by janitorial staff who dispose of excess material. The dust hood work area is regularly vacuumed to remove excess dust. At present, there is no medical surveillance program directly related to the problem. We are awaiting further comments from the Ministry of Labour with respect to appropriate sampling procedures to ensure that our facility meets their guidelines. We anticipate that the Occupational Health Branch of the Ontario Ministry of Labour will be able to guide us with respect to any modifications if required to the dust control system.

W. D. McIlveen

WDM/cc/C5-35

W. D. McIlveen
Plant Pathologist



199 Larch Street
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June 23, 1986

M E M O R A N D U M : 6

TO: Jim Fry
Manager, Technician Support

FROM: Jim Pomerleau
Manager, Administrative Services

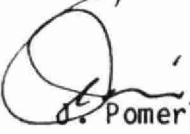
RE: Noise Level Survey Phyto - Grinding Room

I am attaching a copy of the noise survey conducted by Wayne Maitland on June 10, of the above noted work location.

These recommendations are submitted for your consideration.

- A. Substitute the present vacuum cleaner for a quieter model.
- B. If the number of samples to be processed is going to mean an excessive exposure, schedule sample grinding for shorter periods spread over a number of days, or rotate staff so that the length of time is reduced for any one exposure.
- * C. Provide hearing protection for staff.
- * D. Post the entrance to the area with a clearly visible warning sign indicating as well the daily exposure permitted as per Section 144 Ontario Regulation 658-79, copy attached.

Should additional information be required with respect to the survey, kindly contact myself or Wayne Maitland at your convenience.


J. Pomerleau

JP/ae/C6-52



199 Larch Street
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705/675-4501

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705/675-4501

January 16, 1987

M E M O R A N D U M: 7

TO: John Negusanti
Environmental Biologist
Phytotoxicology Specialist

FROM: Wayne Maitland
Regional Safety Officer

RE: Sound Levels in Processing Room
12th Floor, 199 Larch Street

On November 27, 1986, sound level measurements were taken by W. Maitland, Regional Safety Officer, using a Bruel Kjaer sound level meter type-2219. The sound emitting sources in the area are identified as being electrically operated systems for grinding (a Wiley mill), ventilation and vacuum cleaning. Measurements with all equipment in operation were taken to determine the maximum level attainable in the area. A maximum reading of 78 dBA was noted. The minimum reading with all equipment running was recorded at 72 dBA. The equipment in operation was considered to be the normal operating equipment for the area. It is possible that other sound sources could be introduced, such as a radio; however, this would represent exceptional rather than normal operating conditions, and; therefore, no attempt was made to measure sound under these circumstances. The maximum sound level generated in this area, with the present installed equipment, is less than the daily exposure permitted under applicable regulations (reference - Regulations for Industrial Establishments made under The Occupational Health and Safety Act, Section 144).


W. Maitland

WM/ad/C1-51

c.c.: J. O. Pomerleau
R. Potvin



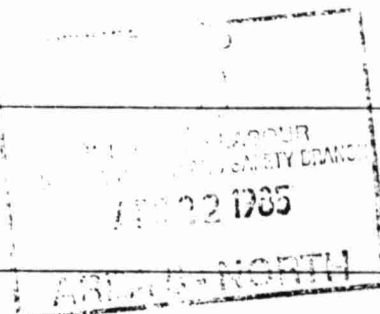
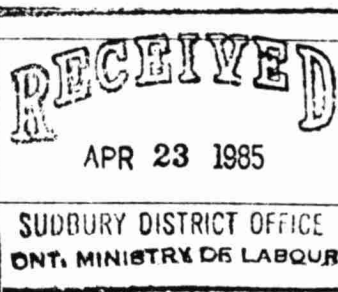
Date 85.04.12	From/De J.G. Collinson	E.A.R. No./R.E.E. N° 85B408-A
I.S.B. File No./Dossier D.S.S.I. N° 0931-00019-0011	I.H.S.B. Region No./Région D.S.S.I. N° 44-46	O.H.B. File No./Dossier D.S.T. N° 20484GEOA

Plant / Entreprise

Ministry of the Environment

Address / Adresse

199 Larch Street, 11th Floor
Sudbury, Ontario.
P3E 5P9



Hazard / Risque

Total dust, respirable silica

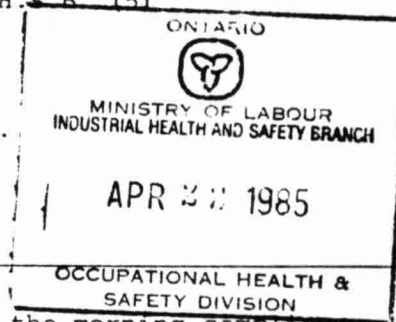
Measures Suggested / Recommendations

☒ Yes / Oui ☐ No / Non

Further Action by O.H.B. / Autres mesures à prendre le D.S.T.

Copies to / Copies à

R. Dyson, I.H.S.B. (5)
M. Nazar
J. Roos
M. Budlovsky
O.H.B. Files.



The exposure assessment report of Mr. F. Bouma indicates that for the morning sampling period the airborne concentration of respirable silica was less than the lower detection limit of 0.01 milligrams of silica which translates, in this case, to an equivalent concentration of 0.05 milligrams per cubic metre of air (mg/m^3), in the afternoon the area and personal sampling in the soils test lab revealed concentrations of $0.1 \text{ mg}/\text{m}^3$. During the morning sampling period the fan filter unit was recirculating the filtered air back into the lab underneath the work bench, but during the afternoon period the exhaust was ducted out of the lab into the ceiling space above the suspended tile ceiling. I do not believe that this change in ducting is the cause of the difference in the respirable silica results. In any event the airborne silica concentration appears to be at or below the exposure standard of $0.2 \text{ mg}/\text{m}^3$ recommended in the Silica Regulation. In spite of the acceptable silica levels, I believe that the recirculation of filtered air to the lab should be discontinued since the filter efficiency may deteriorate resulting in higher silica exposures than were measured during this survey. In addition, I suggest that the vacuum cleaner used to clean the screens should also be fitted with a high efficiency particulate air filter.

Advise to IHSB Inspectorate.

Issue an order requiring the local exhaust system to be vented outside the building.

J.G. Collinson

J.G. Collinson, P. Eng.
Supervisor, Occupation Hygiene

/jb



Date 85 03 26	From/De F.J. Bouna Occupational Health Technician	E.A.R. No./R.E.E. N° 85 B408-A
H.S.B. File No./Dossier D.S.S.I. N° 0931 00019 0011	I.H.S.B. Region No./Région D.S.S.I. N° 44-46	O.H.B. File No./Dossier D.S.T. N°
Plant/Usine MINISTRY OF ENVIRONMENT	Date of Request/Date de la demande 85 02 21	
Address/Adresse 199 Larch St., 11th Floor Sudbury, Ontario P3E 5P9	Requested by/Demandé par Mr. J.G. Collinson	
	Accompanied by/Accompagné par Mr. J.G. Collinson	
	Date of Visit/Date de la visite 85 03 04 and 85 03 06	
	Copies to/Copies à Mr. J.G. Collinson	
Contacts/Personnes contactées Mr. Bill McIlveen - Plant Pathologist Mr. Ray Potvin - Chief of air quality Assessment Mr. W. Maitland - Safety Office		
Hazard/Risque TOTAL DUST RESPIRABLE SILICA		

Abstract/Sommaire des résultats

This soil test lab was visited to determine employee exposure to the above mentioned hazards. Sampling was done with the ventilation recirculating, and exhausted out of the room.

Mr. Potvin from management and Mr. W. Maitland from the union were contacted.

Sampling Procedure

Silica sampling was done using calibrated pumps operating at 1.7 litres per minute. Samples were taken using 10 millimetre nylon cyclones coupled with plastic cassettes each containing 25 millimetre diameter 5 micrometer pore size silver membranes. Analysis was done by x-ray diffraction technique.

Total Dust sampling was done using calibrated pumps operating at 2.0 litres per minute. Samples were taken using 3-piece plastic cassettes, each containing 37 millimetre diameter, 5 micrometer pore size, P.V.C. membranes. Analysis was done gravimetrically.

Attached tables list concentrations found in the employees breathing zone and work environment.

NOTE: Bulk sample lab analysis also attached.

Observations85 03 04 Recirculation of the ventilation

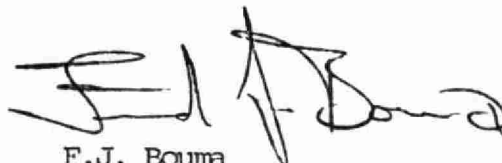
1. The door of the room was open.
2. The ventilation system was operating.
3. The operator was wearing a respirator (3-M 8710 - approval #TC-21C-132).
4. A total of 17 samples were processed during sampling.
5. Only the centre section of the plexiglass enclosure was open.
6. A shop-vac vacuum cleaner was used to clean the sieve screens after the processing of each sample - This vacuum was not ventilated.

85 03 06 Ventilation exhausted out of room

1. All procedures as noted above
2. A total of 20 samples processed

Operational data

1. Soil samples are ground in a mortar.
2. The samples are sieved through No. 10 sieve mesh size .0787" then through No. 45 sieve mesh size .0139."
3. A shop vac vacuum is then used to clean the apparatus.



F.J. Bouna
Occupational Health Technician
Occupational Health & Safety Branch
Sudbury, Ontario
85 03 22

/gk



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au travail

Laboratoire
de la santé
au travail

Table of Results Résultats

- ☒ Personal Samples
Échantillons (personnes)
- ☒ Area Samples
Échantillons (milieu)

Company
Compagnie

Ministry of
Environment

Company No./N°
de compagnie

Date

85 03 04

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Table No.
Tableau n°

1

Address
Adresse

199 Larch St. 11th Floor,
Sudbury

O.H.B. File No.
N° de dossier (Direction)

E.A.R. File No.
N° (dossier de rapport sur l'exp.)

85B408-A

Hazard/Risque

SILICA

Hazard Code/Code de
Risque

1 1 1 1 1 1 1 1 1 1

*Standard or T.L.V.

Norme ou valeur de seuil

.2 mg/m³

Air Sample No. N° de l'échantillon d'air	☒ Employees Name and Nom de l'employé et Job Description or profession ou ☒ Location lieu de travail		Sampling Time Échantillonnage (heure)		Sampling Duration Minutes Durée (minutes)	Air Volume Litres corrected for Temp. Press Volume d'air (litres) en fonction de temp./pr.	Results of Analysis Résultats de l'analyse ☒ Milligrams Milligrammes ☐ Micrograms Microgrammes ☐ Microlitres	Concentration Measured Mesure de la concentration ☒ mg/m³ of air mg/m³ d'air ☐ ppm ☐ Fibres/cc	* Remarks/Remarques
			Start Début	Finish Fin					
	<u>SOIL TEST LAB</u>								
# 1	Bill McIlveen - Processing samples		9:21	11:43	**118	201	< 0.01	*	
2	Back wall of room		9:21	11:43	**118	201	< 0.01	*	
	<u>AIR QUALITY LAB</u>								
# 3	On data processor		9:25	11:49	144	245	< 0.01	*	
	** Monitors shut off for coffee break								
	* Regardless of air volume sampled the airborne concentration of silica was not detected at or above the lower detection limit of 0.01 milligrams.								

*Completed by O.H.B. Consultant/Remplie par la conseiller de la Direction de la santé au travail



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Table of Results Résultats

Company
Compagnie

Ministry of
Environment

Company No./N°
de compagnie

Date

85 03 06

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Table No.
Tableau n°

2

☒ Personal Samples
Echantillons (personnes)

☒ Area Samples
Echantillons (milieu)

Address
Adresse

199 Larch St. 11th Floor,
Sudbury

O.H.B. File No.
N° de dossier (Direction)

E.A.R. File No.
N° (dossier de rapport sur l'exp.)

85B408-A

Hazard/Risque

SILICA

Hazard Code/Code de
Risque

*Standard or T.L.V.
Norme ou valeur de seuil

.2 mg/m³

Air Sample No. N° de échantillon d'air	☒ Employees Name and Nom de l'employé et Job Description or profession ou ☒ Location lieu de travail	Occup. Code/ Code d'emploi	Sampling Time Echantillonnage (heure)		Sampling Duration Minutes Durée (minutes)	Air Volume Litres corrected for Temp. Press Volume d'air (litres) en fonction de temp./pr	Results of Analysis Résultats de l'analyse ☒ Milligrams Milligrammes ☐ Micrograms Microgrammes ☐ Microlitres	Concentration Measured Mesure de la concentration ☒ mg/m ³ of air mg/m ³ d'air ☐ ppm ☐ Fibres/cc	*Remarks/Remarques
			Start Début	Finish Fin					
	<u>SOIL TEST LAB</u>								
# 1	John Negusanti-Processing samples		13:30	16:00	* 115	196	0.02	0.1	
2	Back wall of room		13:30	16:00	* 115	196	0.02	0.1	
	<u>AIR QUALITY LAB</u>								
# 3	On data processor		13:35	16:12	157	267	< 0.01	< 0.04	
* Monitors shut off for coffee break.									

*Completed by O.H.B. Consultant/Remplie par la conseiller de la Direction de la santé au travail



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au travail

Table of Results Résultats

- ☒ Personal Samples
Échantillons (personnes)
☒ Area Samples
Échantillons (milieu)

Company
Compagnie
**Ministry of
Environment**

Address
Adresse
**199 Larch St. 11th Floor
Sudbury, Ont.**

Company No./N°
de compagnie

Date

85 03 06

O.H.B. File No.
N° de dossier (Direction)

Page 5 of 5

Table No.
Tableau n°

3

E.A.R. File No.
N° (dossier de rapport sur l'exp.)

85B408-A

Hazard/Risque

TOTAL DUST

Hazard Code/Code de
Risque

|||||H|||

*Standard or T.L.V.
Norme ou valeur de seuil

10 mg/m³

Air Sample No. N° de l'échantillon d'air	☒ Employees Name and Nom de l'employé et Job Description or profession ou ☒ Location lieu de travail	Occup. Code/ Code d'emploi	Sampling Time Échantillonnage (heure)		Sampling Duration Minutes Durée (minutes)	Air Volume Litres corrected for Temp. Press Volume d'air (litres) en fonction de temp./pr.	Results of Analysis Résultats de l'analyse ☒ Milligrams Milligrammes ☐ Micrograms Microgrammes ☐ Microlitres	Concentration Measured Mesure de la concentration ☒ mg/m ³ of air mg/m ³ d'air ☐ ppm ☐ Fibres/cc	* Remarks/Remarques
			Start Début	Finish Fin					
C-1	John Negusanti - Processing samples		13:30	16:00	* 115	230	0.2	0.9	
	* Monitors shut off for coffee break								

* Completed by O.H.B. Consultant/Remplie par la conseiller de la Direction de la santé au travail



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101 Resources Road
Weston, Ontario
M9P 3T1
(416) 248-7261

RE: Samples for alpha quartz analysis from
the Ministry of the Environment, Sudbury,
submitted by F.J. Bouma, O.H.B., Sudbury.

Samples received: 85 03 06

Report No.

A-11,591

Date

85 03 11

Copies to

F.J. Bouma

Three (3) 25 mm filters plus a blank were received for
analysis. The results are given in the attached table.

The detection limit for quartz collected on a 25 mm
filter is 0.01 mg.

Analysis by A. D'Onofrio
on 85 03 11

TWSP/js

Anthony E. Emery
Thomas W.S. Pang
Thomas W.S. Pang, O.E.



Spl. #	Filter #	Net Wt. of Resp.Dust (mg)	Vol.of Air Sampled (m ³)	Alpha Quartz Analysis by XRD			Resp.Dust mg/m ³	Parameters used to Est.(SiO ₂)			
				Wt.on Filter (mg)	mg/m ³	%		d(101)		d(112)	
								pk.area	pk.ht.	pk.area	pk.ht.
1	1			B.D.L.*				X		X	
2	2			B.D.L.				X		X	
3	3			B.D.L.				X		X	
4	Blk			B.D.L.					X		X
A-11,591 25 mm *B.D.L. - below detection limit.											



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101 Resources Road
Weston, Ontario
M9P 3T1
(416) 248-7261

RE: Samples for alpha quartz analysis from
the Ministry of the Environment, Sudbury,
submitted by F.J. Bouma, O.H.B., Sudbury.

Samples received: 85 03 08

Report No. A-11,601

Date 85 03 11

Copies to
F.J. Bouma

Three (3) 25 mm filters plus a blank were received for
analysis. The results are given in the attached table.

The detection limit for quartz collected on a 25 mm
filter is 0.01 mg.

Analysis by A. D'Onofrio
on 85 03 11

TWSP/js

Thomas W.S. Pang
Thomas W.S. Pang, P.E.



Spl. #	Filter #	Net Wt. of Resp.Dust (mg)	Vol.of Air Sampled (m ³)	Alpha Quartz Analysis by XRD			Resp.Dust mg/m ³	Parameters used to Est.(SiO ₂)			
				Wt.on Filter (mg)	mg/m ³	%		d(101)		d(112)	
								pk.area	pk.ht.	pk.area	pk.ht.
1	1			0.02				X		X	
2	2			0.02				X		X	
3	3			B.D.L.*				X		X	
4	Blk			B.D.L.				X		X	
A-11,601 25 mm *B.D.L. - below detection limit.											



E: Sample for quartz analysis from Ministry of Environment, Soil Test Lab., Sudbury, submitted by F.J. Bouma, O.H.B., Sudbury.

Samples received: 85 03 08

Report No. 21,282

Date 85 03 19

Copies to

F.J. Bouma

Quartz analysis on bulk samples

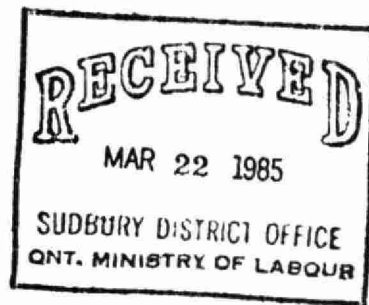
Two (2) bulk samples were received for quartz analysis. They were treated with aqua regia and phosphoric acid. They were then analyzed by X-ray diffraction and by petrographic microscopy. The results are as follows:

Sample A: The sample was found to contain 31% quartz. The sample was also found to contain feldspar.

Sample B: The sample was found to contain 36% quartz. The sample was also found to contain feldspar.

Analysis by K. Patel
on 85 03 19

TWSP/js



Kishore Patel
Thomas W.S. Pang
Thomas W.S. Pang,
P.Eng.



RE: One sample from Ministry of the Environment,
Sudbury, submitted by J.G. Collinson, O.H.B.,
Sudbury.

Sample received: 85 02 26

Report No.

21,260

Date

85 03 12

Copies to

J.G. Collinson

Lead analysis

A portion of the dust was digested with acid and analyzed by plasma emission spectrometry. It was found to contain less than 0.1% lead.

Analysis by F. Lo
on 85 03 06-07

DA/js

D. Arai, B.A.

Quartz analysis on bulk sample

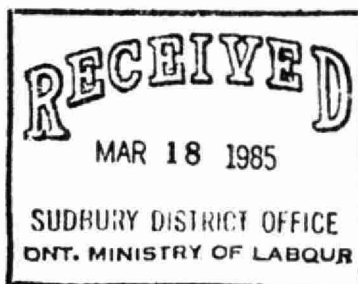
The above sample was also treated with aqua-regia and phosphoric acid. It was then analyzed by X-ray diffraction and by petrographic microscopy. The result is as follows:

(1) Filter Dust: The sample was found to contain 28% quartz.

Analysis by K. Patel
on 85 03 12

TWSP/js

Kishore Patel
Thomas W.S. Pang,
P.Eng.





SAFETY INSPECTION REPORT

COMMENT:

June 10/86

Soils Laboratory

Grinding Room Noise Level Survey

Grinding room mechanical operating equipment includes: grinding apparatus, tray shaker, vacuum cleaner.

This equipment may be in operation singly or in any combination. The grinding room is approximately eight feet by ten feet with one ten foot wall windowed.

The noise levels with the shaker only operating ranged from a low of 84dBA to a high of 96dBA. The maximum reading was taken within 12 inches of the shaker apparatus. Noise levels in the hearing zone of any person working in the room ranged from 84dBA to 94dBA. The reading at the entrance to the room was 88dBA.

The room noise level readings with the vacuum cleaner in operation ranged from a low of 94dBA to a high of 104dBA. The maximum reading was obtained within 12 inches of the vacuum cleaner. Noise levels in the hearing zone of any person working in the room ranged from 94dBA 98dBA. The sound of the vacuum cleaner is an annoying steady whine. It was noted that when the vacuum hose was blocked the noise produced by the vacuum increased by about 2dBA. The noise level reading within 12 inches of the vacuum under these conditions was 106dBA. At the entrance to the room a reading of 94dBA was measured.

NOTE: While normal grinding operations were in progress a radio was playing near the entrance to the room (inside the room).

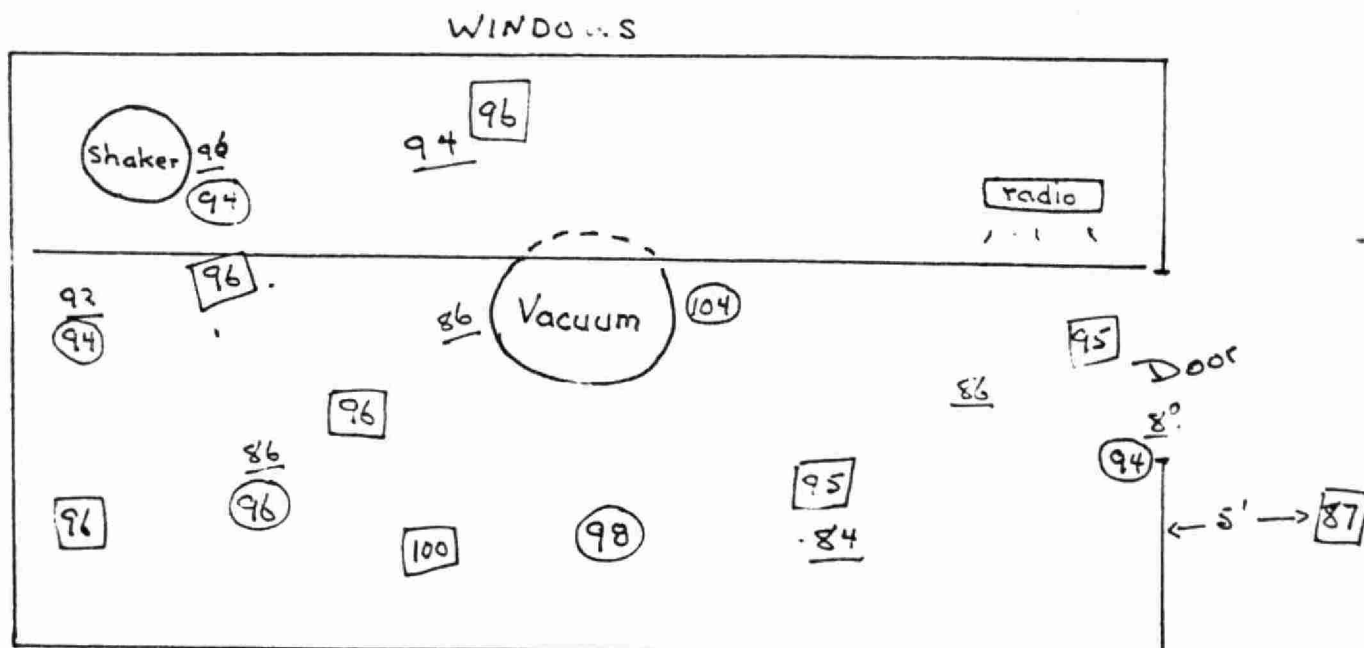


SAFETY INSPECTION REPORT

COMMENTS:

Noise level readings were measured with a Brüel and Kjaer type 2219 sound level meter conforming to the standard Z107.1 of the Canadian Standards Association operating on the A weighting network with slow meter response.

Measurements taken indicate that action is required to comply with Regulation 144 under the Occupational Health and Safety Act.



Legend

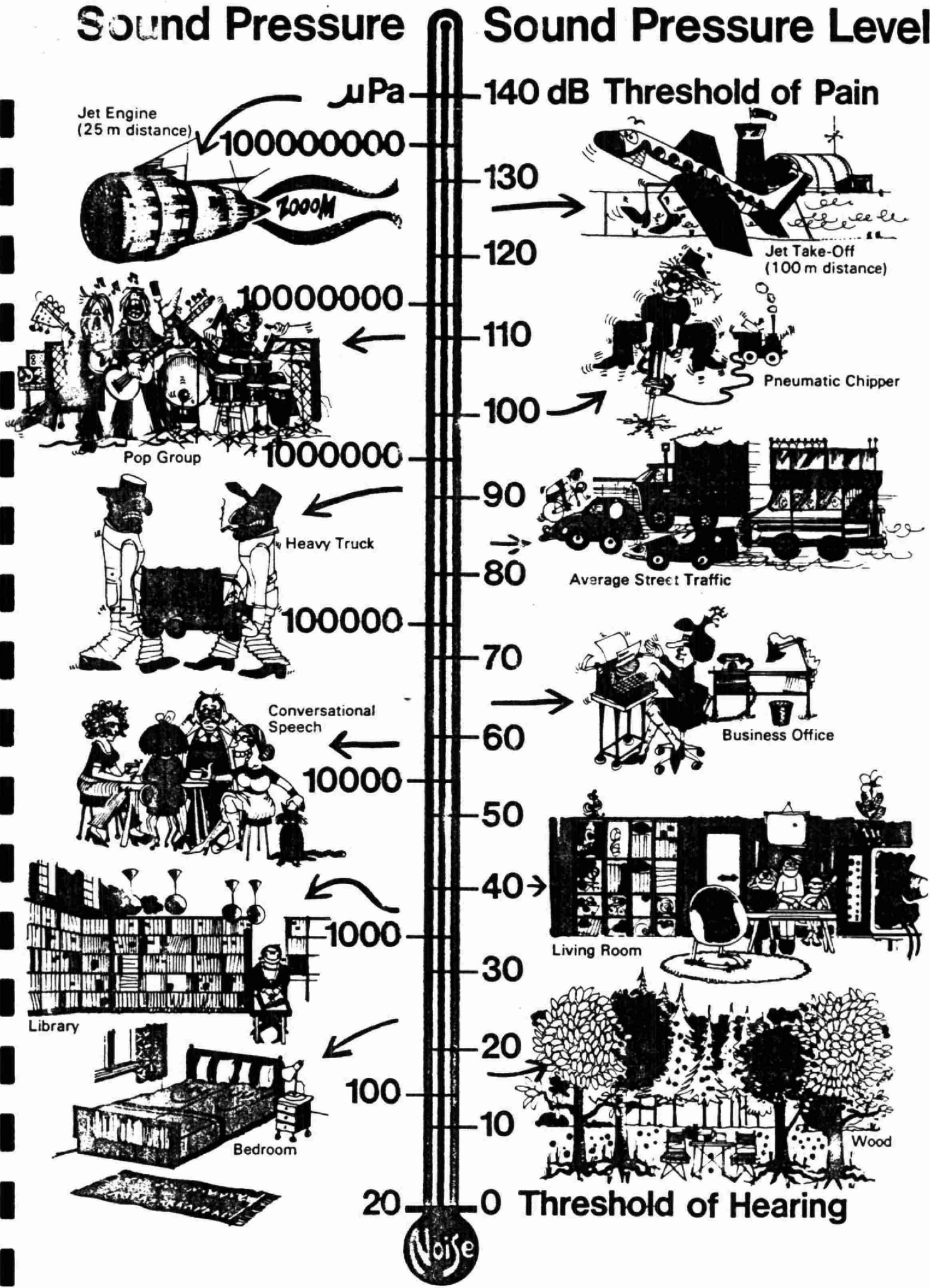
Readings	shaker only operating	—	dB(A)
"	vacuum only operating	○	dB(A)
"	shaker & vacuum operating	□	dB(A)

W. T. Mainland

Regional Safety Officer

Sound Pressure

Sound Pressure Level



Brüel & Kjær

DK-2850 NÆRUM, DENMARK · Telephone: +45 2 80 05 00 · Telex: 37316 brua dk

144.—(1) In this section, "decibel" means decibel measured on a type 2 sound level meter conforming to the standard Z107.1 of the Canadian Standards Association operating on the A-weighting network with slow meter response.

(2) Where a worker is exposed to a sound level of ninety decibels or greater,

(a) measures shall be taken to reduce the sound level below ninety decibels; and

(b) where such measures are not practicable,

(i) the duration of exposure set out in Column 2 of the Table in subsection 5 shall not exceed the duration shown for the particular sound level set opposite thereto in Column 1 of the Table in subsection (5), or

(ii) the person shall wear hearing protection.

(3) Where a worker is exposed to a sound level of 115 decibels or greater, he shall wear hearing protection.

(4) Clearly visible warning signs shall be posted at the approaches to an area where the sound level is more than ninety decibels.

(5) The warning signs referred to in subsection (4) shall state,

(a) the daily exposure for the particular sound level permitted by the following Table, and

(b) that hearing protection must be worn when the daily exposure is more than that permitted for the particular sound level.

TABLE

COLUMN 1	COLUMN 2
Sound Level— in Decibels	Duration—Hours per 24 hour Day
90	8
92	6
95	4
97	3
100	2
102	1½
105	1
110	½
115	¼ or less
Over 115	No exposure

(6) Where hearing protection is required by this section, the protection shall be sufficient to reduce the sound level below the sound level in Column 1 of the Table in subsection (5) for the exposure corresponding to that sound level in Column 2 of the Table in subsection (5). O. Reg. 658/79, s. 144.



MOE/SUD/OVE/APFY

MOE/SUD/OVE/APFY

Negusanti, J.J.

Overview of the

dust, silica and

apfy

c.1 a aa